Speaker: Prof. Chris Dames
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Abstract: Graphene (sheets of graphite one to several atoms thick) has attracted great attention since the first isolation and electrical measurements of individual sheets in 2004. Due in part to its unique electron dispersion relation, graphene has exceptionally high electron mobility and current-carrying capacity, making it an appealing candidate for post-silicon microelectronics. To advance our fundamental understanding, as well as to enable applications, it is essential to understand the heat transfer and thermo-mechanics of graphene encased by dielectric materials. To this end, I will describe three of cur recent measurements:

(1) The thermal contact resistance between graphene and silicon dioxide.

(2) The thermal conductivity along individual graphene sheets encased in dielectric layers, which we find to be much smaller than what has been reported for graphite or suspended graphene.

(3) The thermal expansion coefficient of suspended graphene, which, in accordance with theoretical expectations, we find to be relatively large and negative. We also observe one- and two-dimensional ripple patterns that can be understood using continuum elasticity, even for sheets only one atom thick.

Biography: Chris Dames joined the Department of Mechanical Engineering at the University of California,Riverside in 2006, where he is also affiliated with the program in Materials Science and Engineering. He received his Ph.D. in Mechanical Engineering from the Massachusetts Institute of Technology, and his B.S. and M.S. from UC Berkeley, including a year at the University of Auckland, New Zealand. In 1998-1999 he worked for Solo Energy Corp. on 40-80 kW ÒmicroÓ gas turbines. Dr. DamesÕ expertise is in modeling and experiments on nanostructures used for energy conversion, currently emphasizing graphene, thermoelectrics, and thermal rectification. He is funded by NSF, DARPA, and DOE, and is the recipient of a 2009 DARPA Young Faculty Award.